

# NIDCD Fact Sheet

## Stuttering

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES · NATIONAL INSTITUTES OF HEALTH · NATIONAL INSTITUTE ON DEAFNESS AND OTHER COMMUNICATION DISORDERS

### What is stuttering?

Stuttering is a speech disorder in which sounds, syllables, or words are repeated or prolonged, disrupting the normal flow of speech. These speech disruptions may be accompanied by struggling behaviors, such as rapid eye blinks or tremors of the lips. Stuttering can make it difficult to communicate with other people, which often affects a person's quality of life.

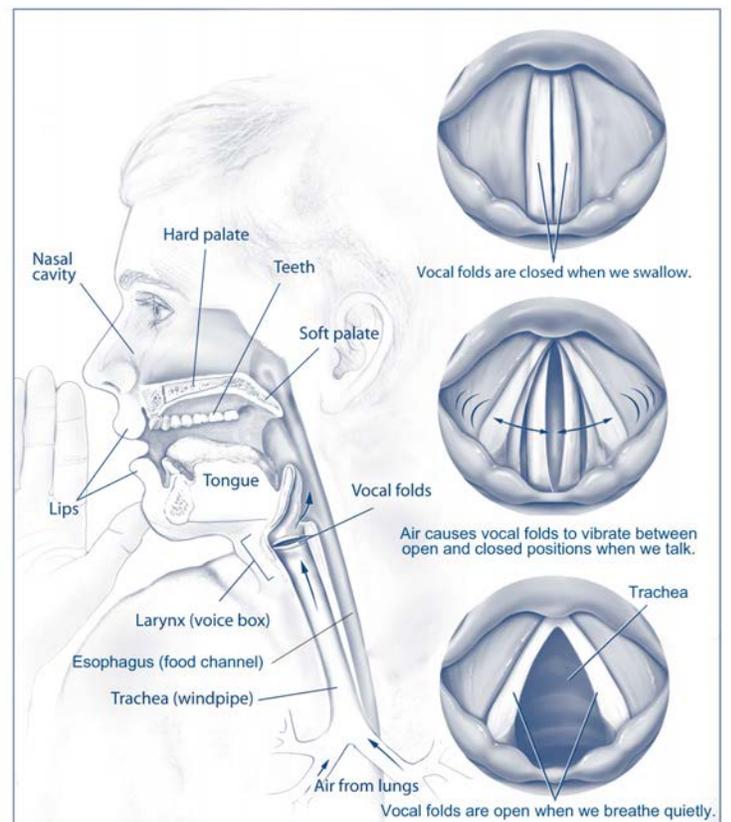
Symptoms of stuttering can vary significantly throughout a person's day. In general, speaking before a group or talking on the telephone may make a person's stuttering more severe, while singing, reading, or speaking in unison may temporarily reduce stuttering.

Stuttering is sometimes referred to as *stammering* and by a broader term, *disfluent* speech.

### Who stutters?

Roughly three million Americans stutter. Stuttering affects people of all ages. It occurs most often in children between the ages of 2 and 5 as they are developing their language skills. Approximately 5 percent of all children will stutter for some period in their life, lasting from a few weeks to several years. Boys are twice as likely to stutter as girls; as they get older, however, the number of boys who continue to stutter is three to four times larger than the number of girls. Most children outgrow stuttering. About 1 percent or less of adults stutter.

### Structures involved in speech and voice production



### How is speech normally produced?

We make speech sounds through a series of precisely coordinated muscle movements involving breathing, phonation (voice production), and articulation (movement of the throat, palate, tongue, and lips) (see figure). Muscle movements are controlled by the brain and monitored through our senses of hearing and touch.



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### What causes stuttering?

Although the precise mechanisms are not understood, there are two types of stuttering that are more common. (A third type of stuttering, called psychogenic stuttering, can be caused by emotional trauma or problems with thought or reasoning. At one time, all stuttering was believed to be psychogenic, but today we know that psychogenic stuttering is rare.)

#### Developmental stuttering

Developmental stuttering occurs in young children while they are still learning speech and language skills. It is the most common form of stuttering. Some scientists and clinicians believe that developmental stuttering occurs when children's speech and language abilities are unable to meet the child's verbal demands. Developmental stuttering also runs in families. In 2010, for the first time, NIDCD researchers isolated three genes that cause stuttering. More information on the genetics of stuttering can be found in the research section of this fact sheet.

#### Neurogenic stuttering

Neurogenic stuttering may occur after a stroke, head trauma, or other type of brain injury. With neurogenic stuttering, the brain has difficulty coordinating the different components involved in speaking because of signaling problems between the brain and nerves or muscles.

### How is stuttering diagnosed?

Stuttering is usually diagnosed by a speech-language pathologist (SLP), a health professional who is trained to test and treat individuals with voice, speech, and language disorders. The speech-language pathologist will consider a variety of factors, including the child's case history (such as when the stuttering was first

noticed and under what circumstances), an analysis of the child's stuttering behaviors, and an evaluation of the child's speech and language abilities and the impact of stuttering on his or her life.

When evaluating a young child for stuttering, a speech-language pathologist will try to predict if the child is likely to continue his or her stuttering behavior or outgrow it. To determine this difference, the speech-language pathologist will consider such factors as the family's history of stuttering, whether the child's stuttering has lasted six months or longer, and whether the child exhibits other speech or language problems.

### How is stuttering treated?

Although there is currently no cure for stuttering, there are a variety of treatments available. The nature of the treatment will differ, based upon a person's age, communication goals, and other factors. If you or your child stutters, it is important to work with a speech-language pathologist to determine the best treatment options.

For very young children, early treatment may prevent developmental stuttering from becoming a lifelong problem. Certain strategies can help children learn to improve their speech fluency while developing positive attitudes toward communication. Health professionals generally recommend that a child be evaluated if he or she has stuttered for three to six months, exhibits struggle behaviors associated with stuttering, or has a family history of stuttering or related communication disorders. Some researchers recommend that a child be evaluated every three months to determine if the stuttering is increasing or decreasing. Treatment often involves teaching parents about ways to support their child's production of fluent speech. Parents may be encouraged to:

- Provide a relaxed home environment that allows many opportunities for the child to speak. This includes setting aside time to talk to one another, especially when the child is excited and has a lot to say.
- Refrain from reacting negatively when the child stutters. Instead, parents should react to the stuttering as they would any other difficulty the child may experience in life. This may involve gentle corrections of the child's stuttering and praise for the child's fluent speech.
- Be less demanding on the child to speak in a certain way or to perform verbally for people, particularly if the child experiences difficulty during periods of high pressure.
- Speak in a slightly slowed and relaxed manner. This can help reduce time pressures the child may be experiencing.
- Listen attentively when the child speaks and wait for him or her to say the intended word. Don't try to complete the child's sentences. Also, help the child learn that a person can communicate successfully even when stuttering occurs.
- Talk openly and honestly to the child about stuttering if he or she brings up the subject. Let the child know that it is okay for some disruptions to occur.

### **Stuttering therapy**

Many of the current therapies for teens and adults who stutter focus on learning ways to minimize stuttering when they speak, such as by speaking more slowly, regulating their breathing, or gradually progressing from single-syllable responses to longer words and more complex sentences. Most of these

therapies also help address the anxiety a person who stutters may feel in certain speaking situations.

### **Drug therapy**

The U.S. Food and Drug Administration (FDA) has not approved any drug for the treatment of stuttering. However, some drugs that are approved to treat other health problems—such as epilepsy, anxiety, or depression—have been used to treat stuttering. These drugs often have side effects that make them difficult to use over a long period of time. In a recent study funded by the National Institute on Deafness and Other Communication Disorders (NIDCD), researchers concluded that drug therapy has been largely ineffective in controlling stuttering. Clinical trials of other possible drug treatments are currently underway.

### **Electronic devices**

Some people who stutter use electronic devices to help control fluency. For example, one type of device fits into the ear canal, much like a hearing aid, and digitally replays a slightly altered version of the wearer's voice into the ear so that it sounds as if he or she is speaking in unison with another person. In some people, electronic devices help improve fluency in a relatively short period of time. Nevertheless, questions remain about how long such effects may last and whether people are able to easily use these devices in real-world situations. For these reasons, researchers are continuing to study the long-term effectiveness of these devices.

### **Self-help groups**

Many people find that they achieve their greatest success through a combination of self-study and therapy. Self-help groups provide a way for people who stutter to find resources and support as they face the challenges of stuttering.

**more →**

voice, speech, language

hearing, balance

smell, taste

NIDCD supports and conducts research and research training on the normal and disordered processes of hearing, balance, smell, taste, voice, speech, and language and provides health information, based upon scientific discovery, to the public.

## What research is being conducted on stuttering?

Researchers around the world are exploring ways to improve the early identification and treatment of stuttering and to identify its causes. For example, scientists have been working to identify the possible genes responsible for the types of stuttering that tend to run in families. NIDCD scientists have identified three such genes—one on chromosome 12 and two on chromosome 16—that are the source of stuttering in some study participants in Pakistan, England, and the United States. The three genes, called GNPTAB, GNPTG, and NAGPA, work together to help in the breakdown and recycling of cellular components. Interestingly, other mutations in GNPTAB and GNPTG are tied to two serious metabolic disorders, called mucopolysaccharidosis (ML) II and III, which are also caused by problems with cellular recycling. Researchers are now studying how this defect in the recycling of cell components leads to specific deficits in speech fluency.

Researchers are working to help speech-language pathologists determine which children are most likely to outgrow their stuttering and which children are at risk for continuing to stutter into adulthood. In addition, researchers are examining ways to identify groups of individuals who exhibit similar stuttering patterns and behaviors that may be associated with a common cause.

Scientists are using brain imaging tools such as PET (positron emission tomography) and functional MRI (magnetic resonance imaging) scans to investigate brain activity in people who stutter. NIDCD-funded researchers also are looking at brain imaging as a way to help treat people who stutter. Researchers are studying whether volunteer patients who stutter can learn to recognize, with the help of a computer program, specific speech patterns that are linked to stuttering and to avoid using those patterns when speaking.

## Where can I find additional information?

The NIDCD maintains a directory of organizations that provide information on the normal and disordered processes of hearing, balance, smell, taste, voice, speech, and language. Please see the list of organizations at <http://www.nidcd.nih.gov/directory>.

Use the following keywords to help you search for organizations that can answer questions and provide printed or electronic information on stuttering:

- Stuttering
- Speech-language pathologists

For more information, additional addresses and phone numbers, or a printed list of organizations, contact:

NIDCD Information Clearinghouse  
1 Communication Avenue  
Bethesda, MD 20892-3456  
Toll-free Voice: (800) 241-1044  
Toll-free TTY: (800) 241-1055  
E-mail: [nidcdinfo@nidcd.nih.gov](mailto:nidcdinfo@nidcd.nih.gov)

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NIH Pub. No. 07-4232

March 2010

Reprinted December 2014

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1 Communication Avenue

Bethesda, MD 20892-3456

Toll-free Voice: (800) 241-1044

Toll-free TTY: (800) 241-1055

Fax: (301) 770-8977

E-mail: [nidcdinfo@nidcd.nih.gov](mailto:nidcdinfo@nidcd.nih.gov)

Internet: <http://www.nidcd.nih.gov>

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